CLAIMS

1. A surface-coated cutting tool comprising:

a hard substrate;

a lower layer which is formed on a surface of the hard substrate, contains a composite compound consisting of at least one element selected from Ti and Al, and at least one element selected from N and C, and has an average thickness of 0.1 to 3 μm; and

an upper layer having an average thickness of 1 to 13 μm, which is formed on the lower layer and having a texture in which fine grains of crystalline Ti (C,N) based compounds or fine grains of crystalline (Ti, Al)(C, N) based compounds are dispersively distributed in a matrix of a carbon based amorphous material containing W.

2. A surface-coated cutting tool according to claim 1, wherein the upper layer is composed of an amorphous carbon based lubricant layer containing 5 to 20 atomic % of W, 5 to 30 atomic % of Ti; 0.5 to 30 atomic % of N; and a balance consisting of C and unavoidable impurities.

3. A surface-coated cutting tool according to claim 1, wherein the upper layer is composed of an amorphous carbon based lubricant layer containing 5 to 20 atomic % of W, 5 to 20 atomic % of Ti; 0.5 to 18 atomic % of N; and a balance consisting of C and unavoidable impurities.

4. A surface-coated cutting tool according to claim 1, wherein the upper layer is composed of an amorphous carbon based lubricant layer containing 10 to 40 atomic % of W, 0.5 to 4 atomic % of Ti; 10 to 30 atomic % of N; and a balance consisting of C and

unavoidable impurities.

5. A surface-coated cutting tool according to claim 1, wherein the upper layer is composed of an amorphous carbon based lubricant layer containing 5 to 20 atomic % of W, 2.5 to 10 atomic % of Ti; 0.4 to 22.5 atomic % of N; 1.6 to 15 atomic % of Al; and a balance consisting of C and unavoidable impurities.

6. A surface-coated cutting tool according to claim 1, wherein the upper layer contains a carbon based amorphous material, a matrix of the carbon based amorphous material includes fine grains of crystalline Ti (C,N) based compounds or fine grains of crystalline (Ti, Al)(C, N) based compounds, and the fine crystal grains have an average grain diameter of not larger than 40 nm under observation using a transmission electron microscope.

7. A surface-coated cutting tool according to claim 1, wherein the upper layer contains a carbon based amorphous material, a matrix of the carbon based amorphous material includes fine grains of crystalline Ti (C,N) based compounds or fine grains of crystalline (Ti, Al)(C, N) based compounds, and the fine crystal grains have an average grain diameter of not larger than 20 nm under observation using a transmission electron microscope.

8. A surface-coated cutting tool according to claim 1, wherein the upper layer contains a carbon based amorphous material, a matrix of the carbon based amorphous material includes fine grains of crystalline Ti (C,N) based compounds or fine grains of crystalline (Ti, Al)(C, N) based compounds, and the fine crystal grains have an average

grain diameter of not larger than 10 nm under observation using a transmission electron microscope.

9. A surface-coated cutting tool according to claim 1, wherein the lower layer consists of at least one selected from a TiN layer and a TiCN layer.

10. A surface-coated cutting tool according to claim 1, wherein the lower layer consists of a composite nitride of Ti and Al, which satisfies a compositional formula of $(Ti_{1-X}, Al_X)N$, wherein X ranges from 0.40 to 0.60 by atomic ratio.

11. A surface-coated cutting tool according to claim 1, wherein the lower layer consists of a Ti and Al composite nitride layer having a variable composition structure, and the variable composition structure has a composition distribution structure in which:

portions of maximum Al content and portions of maximum Ti content exist alternately with a predetermined in a thickness direction of the Ti and Al composite nitride layer;

Al and Ti content change continuously from the portion of maximum Ti content to the portion maximum Al content, and from the portion of maximum Al content to the portion of maximum Ti content;

each of the portions of maximum Al content satisfies a compositional formula: $(Al_{1-X}Ti_X)N$ , where X ranges from 0.05 to 0.35 by atomic ratio;

each of the portion of maximum Ti content satisfies a compositional formula: $(Ti_{1-X}Al_X)N$, where X ranges from 0.05 to 0.35 by atomic ratio; and

an interval between two adjacent portions of maximum Al content is 0.01 to 0.1 μm.

12. A surface-coated cutting tool according to claim 1, wherein the hard substrate is composed of tungsten carbide based cemented carbide.

13. A surface-coated cutting tool according to claim 1, wherein the hard substrate is composed of titanium carbonitride based cermet.

14. A method for manufacturing a surface-coated cutting tool, comprising:

preparing a hard substrate;

using a magnetron sputtering apparatus and a Ti target or a Ti-Al alloy target as a cathode, performing deposition of a lower layer in a magnetic field and in a reaction atmosphere composed of a mixed gas of nitrogen and Ar or a mixed gas of resolved gas of hydrocarbon, nitrogen and Ar; and thereby depositing the lower layer having an average thickness of 0.1 to 3 μm and containing a composite compound consisting of at least one element selected from Ti and Al, and at least one element selected from N and C; and

using the magnetron sputtering apparatus and a W target and a Ti target or a Ti-Al target as cathodes, performing formation of an upper layer in a magnetic field on the lower layer in a reaction atmosphere of a mixed gas of resolved hydrocarbon gas, nitrogen and Ar; and thereby depositing the upper layer which has an average thickness of 1 to 13 μm and has a texture in which fine grains of crystalline Ti(C,N) based compounds or fine grains of crystalline (Ti,Al)(C,N) based compounds are dispersively distributed in a matrix of carbon based amorphous material containing W.